PIPADOR REVISION

MRCOG Part 1 Revision Notes

Fats: Sources

BIOCHEMISTRY • LECTURE 218

VISUAL EXAMINATION REVISION NOTES

2026 Edition

MRCOG PART 1 REVISION NOTES | BIOCHEMISTRY

218 Fats: Sources

Dietary fats, digestion and absorption, lipoprotein transport, endogenous synthesis and lipids in pregnancy

≤ 35%	≤ 10%	2 portions	× 2–3
Of energy from fat (UK)	Saturated fat	Oily fish/week in pregnancy (max)	Triglycerides at term

■ **KEY FACTS: Learning objectives**

- Describe dietary sources and recommendations for fats, including in pregnancy.
- Describe fat digestion, absorption and lipoprotein transport.
- Describe endogenous fat synthesis and lipid changes in pregnancy.

218.1 Dietary sources

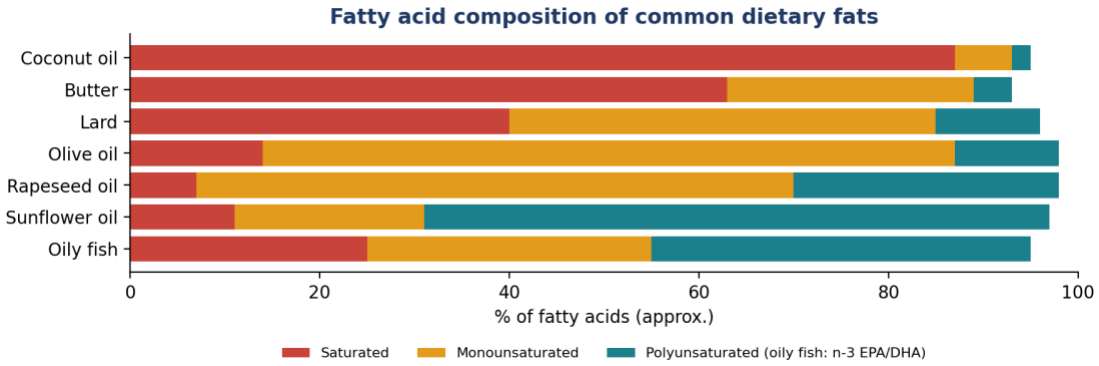


Figure 218.1 — Fatty acid composition of common dietary fats

Type	Main sources	Effects
Saturated	Butter, cheese, fatty meat, coconut/palm oil, pastries	↑ LDL-cholesterol — limit to ≤ 10% of energy
Monounsaturated	Olive and rapeseed oils, avocado, nuts	Neutral/beneficial on lipids
n-6 PUFA	Sunflower, corn, soya oils	↓ LDL; precursor of arachidonic acid
n-3 PUFA (EPA, DHA)	Oily fish (salmon, mackerel, sardines); ALA from linseed, walnuts	Anti-inflammatory, ↓ TG; fetal neurodevelopment — up to 2 portions/week in pregnancy (mercury/pollutant limits; avoid shark, swordfish, marlin)
Trans fats	Partially hydrogenated oils (now restricted)	↑ LDL, ↓ HDL — avoid
Cholesterol	Eggs, offal, shellfish	Modest effect on blood cholesterol for most people

Fat-soluble vitamins (A, D, E, K) need dietary fat for absorption. Breast milk: ≈ 50% of its energy from fat; DHA content reflects maternal intake. Avoid **vitamin A (retinol)/liver** in pregnancy (Lecture 140).

218.2 Digestion and absorption

Lingual & gastric lipase (minor; ▶ **Bile salts emulsify** (duodenum) ▶ **Pancreatic lipase + colipase** → 2- ▶ **Micelles** deliver to enterocytes ▶ Re-esterified → **chylomicrons** →

important in neonates)		monoacylglycerol + FFAs		**lacteals** (lymph) → thoracic duct

- Short/medium-chain fatty acids (**MCT**) are absorbed directly into portal blood — used in **preterm formula**, cholestasis and fat malabsorption.
- Fat malabsorption (steatorrhoea): pancreatic insufficiency (**CF**), bile salt deficiency (cholestasis — **ICP** → ↓ vitamin K), ileal disease, bariatric surgery, **orlistat** (lipase inhibitor).

218.3 Lipoprotein transport

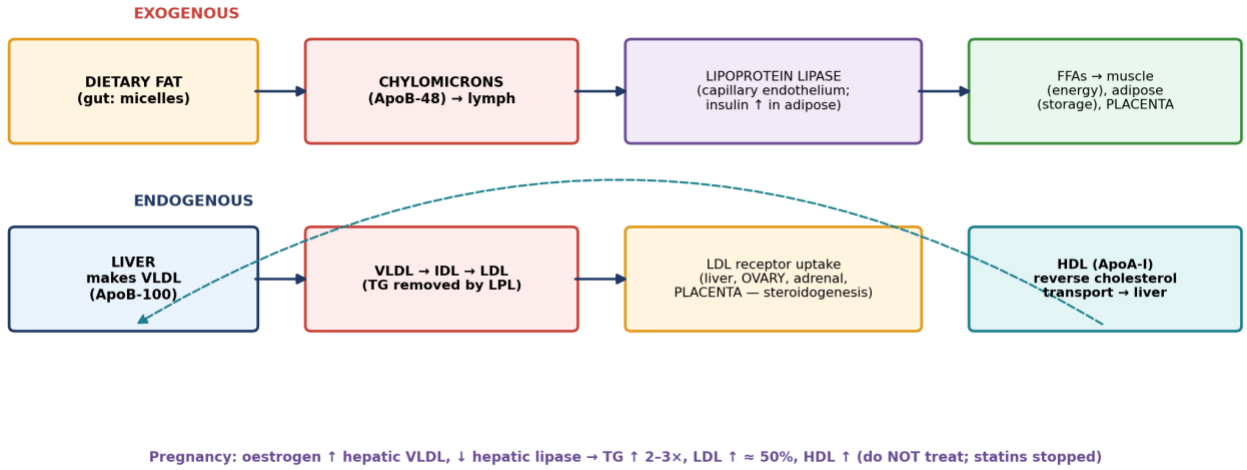


Figure 218.2 — Exogenous and endogenous lipoprotein pathways

Lipoprotein	Major lipid / apoprotein	Function
Chylomicrons	Dietary TG; ApoB-48, ApoC-II, ApoE	Carry dietary fat from gut
VLDL	Hepatic TG; ApoB-100	Carry liver-made TG to tissues
IDL	Intermediate	→ LDL or liver uptake
LDL	Cholesterol; ApoB-100	Deliver cholesterol via LDL receptor (liver, adrenal, ovary, placenta); 'bad' cholesterol — atherogenic
HDL	Phospholipid/cholesterol; ApoA-I	Reverse cholesterol transport to liver; 'good' cholesterol

218.4 Endogenous synthesis and pregnancy

- **De novo lipogenesis** (liver, adipose, lactating breast): acetyl-CoA → **malonyl-CoA (acetyl-CoA carboxylase — insulin-activated, biotin)** → fatty acid synthase (NADPH from pentose phosphate pathway) → palmitate; malonyl-CoA inhibits CPT-1, preventing simultaneous β-oxidation.
- **Cholesterol synthesis**: acetyl-CoA → HMG-CoA → **HMG-CoA reductase** (rate-limiting; **statins**) → mevalonate → cholesterol.
- **Pregnancy**: oestrogen and insulin resistance → ↑ hepatic VLDL, ↓ lipoprotein/hepatic lipase activity → **TG ↑ 2–3×**, total and LDL-cholesterol ↑ ≈ 30–50%, HDL ↑ — a physiological fuel and steroid substrate supply. **Do not measure for screening or treat in pregnancy**; **statins are stopped** pre-conception/when pregnant. Pre-eclampsia, GDM and obesity exaggerate hypertriglyceridaemia.

218.5 Must-know summary

■ EXAM TIP

- Fat ≤ 35% energy; saturated ≤ 10%; avoid trans fats; oily fish ≤ 2 portions/week in pregnancy.
- Bile salts + pancreatic lipase → micelles → **chylomicrons → lymph**; MCTs go straight to portal blood.
- Chylomicrons (B-48), VLDL/LDL (B-100), HDL (A-I); LDL receptor supplies cholesterol for steroidogenesis.
- Pregnancy: **TG ↑ 2–3×**, LDL and HDL ↑ — physiological; statins stopped.

■ MNEMONIC / MEMORY AID

Lipoproteins — 'Chylo from the Chow, VLDL from the liVer, LDL Lays down cholesterol, HDL Hauls it home'.